Paper No. 28

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte HIDEMI NUKADA, YASUO SAKAGUCHI, TAKETOSHI HOSHIZAKI, FUMIO OJIMA, MASAYUKI NISHIKAWA, KOHICHI YAMAMOTO, YUMIKO KOMORI

Appeal No. 1998-0140
Application No. 08/401761

HEARD: February 15, 2001

Before OWENS, JEFFERY T. SMITH, and PAWLIKOWSKI, **Administrative Patent Judges**.

PAWLIKOWSKI, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 3, 4, and 5, which are all of the claims pending in this application.[1]

The subject matter on appeal is illustrated in claim 3, which reads as follows:

[1] We note that the examiner has withdrawn his 35 U.S.C. § 112, first paragraph objection of the specification (this objection was set forth on pages 2-3 of the final Office Action of Paper No. 5) because this objection was not raised in the examiner's Answer.

3. An electrophotographic photoconductive material comprising a titanyl phthalocyanine crystal having a primary particle diameter ranging from 0.03 to 0.15 μm, showing a maximum X-ray diffraction peak at a Bragg angle of (2T±0.2°) of 27.3°, having a ellipsoidal tabular form, and having a BET specific surface area of not less than 35 m^2/g.

The references relied upon by the examiner are as follows:

1. National Bureau of Standards Applied Mathematics Series, U.S. Dep't of Commerce, Tables for Conversion of X-ray Diffraction Angles to Interplanar Spacings, 1, 7, 21, 27, 41, 47, 61, 67, 81, 87, 101, and 107 (1950). [hereinafter referred to as "X-ray Diffraction"]

2. Harold P. Klug and Leroy E. Alexander: X-ray Diffraction Procedures 69 (1974). [hereinafter referred to as "Klug"]

3. B. D. Cullity: Elements of X-ray Diffraction 3, 4, and 21 (1978). [hereinafter referred to as "Cullity"]

The references relied upon by appellants are:

1.	Fujimaki et al. (Fujimaki)	4,898,799	Feb. 6, 1990
2.	Brach et al. (Brach)	3,708,292	Jan. 2. 1973
3.	Ohaku et al. (Ohaku)	4,728,592	Mar. 1, 1988
4.	Kinoshita et al.(Kinoshita)	4,994,339	Feb. 19, 1991
5.	JP '248*	JP-A-61-239248	Oct. 24, 1986
6.	JP '841*	JP-A-51-109841	Oct. 29, 1976
7.	JP '724*	JP-A-48-724	January 8,1973

*partial English translations were submitted for these Japanese patents

8. Wolfgang Hiller and Joachim Strahle, *Polymorphie, Leitfahigkeit und Kristallstrukturen von Oxo-phthalocyaninato-titan (IV)*, Zeitschrift fur Kristallographie, Vol. 159, 173-183 (1982).** [hereinafter referred to as the "Hiller" publication]

**Page 173 of this article contains an English abstract, and the remainder of this document is in the German language.

9. George H. Stout and Lyle H. Jenson: Practice of X-Ray Structural Analysis, 26-34 (1989).*** [hereinafter referred to as the "Stout" publication]

***Section 1.3 of the Stout publication was translated into English, and this English translation was provided as representative of this publication.

10. T.D. Sims et al., *Comparison of Supramolecular Aggregate Structure and Spectroscopic and Photoelectrochemical Properties of Tetravalent and Trivalent Metal Phthalocyanine Thin Films*, Chemistry of Materials, 26-34, (1989). [hereinafter referred to as the "Sims" publication]

Claims 3, 4, and 5 stand rejected under 35 U.S.C. §112, paragraph 2.

OPINION

For the reasons set forth below, we reverse the above-noted rejection.

The examiner rejects claims 3, 4, and 5 under 35 U.S.C. § 112, paragraph 2, as being indefinite for failing to particularly point out and distinctly claim the subject matter which appellants regard as their invention. (Answer, page 4).

Here, the examiner asserts that the claims are indefinite because the wavelength for determining the Bragg angle has not been identified in the specification and thus it is unclear what phthalocyanines are being claimed. (Answer, pages 4-5). The examiner asserts there are many different wavelengths that can be used in the art to determine Bragg angles, and therefore it is critical to identify the type of radiation source utilized when irradiating a titanyl phthalocyanine crystal in order to provide meaning to the Bragg angles used in defining the

titanyl phthalocyanine crystal. (Answer, page 5). The examiner refers to the X-ray Diffraction publication for showing that different radiation sources will provide different d-spacing values. The examiner refers to the Klug publication for showing that different radiation sources can be used in the art. Finally, the examiner refers to the Cullity publication for showing that X-rays used in X-ray diffraction can have different wavelengths. (Answer, page 5).

Appellants rebut and state that none of the references relied upon by the examiner describe the type of radiation the art employs for measuring the properties of titanyl phthalocyanine crystals, generally or specifically. Appellants assert that the references only list types of radiation employed in X-ray diffraction analyses without any criteria for selecting one over the another. (Brief, page 9).

Appellants further argue that the skilled artisan would know to employ CuKa radiation in making X-ray diffraction measurements of a titanyl phthalocyanine crystal because the art shows CuKa radiation is the standard in making X-ray diffraction measurements of titanyl phthalocyanine crystals. (Brief, page 3,4, and 7). Appellants refer to the references, listed at the bottom of page 2 and at the top of page 3 of this opinion, for this showing. (Brief, pages 4-6). Appellants also refer to a Rule 132 Nukada Declaration, and assert that it demonstrates that CuKa radiation was in fact employed for Example 1 of appellants' specification. (Brief, page 5).

Upon our review of the publications relied upon by the examiner, we agree with appellants' assessment of these

publications. That is, none of them pertain to X-ray diffraction of titanyl phthalocyanine crystals. Therefore, none of these publications provide insight regarding the type of radiation known to have been used in the art in making X-ray diffraction measurements of titanyl phthalocyanine compounds at the time of appellants' invention.

Upon our review of appellants' references listed at the bottom of page 2 and at the top of page 3 of this opinion, we find that most of these references indicate use of CuKa radiation in making X-ray diffraction measurements of titanyl phthalocyanine crystals.[2] The examiner does not disagree with this assessment of these references.[3] (Answer, page 6). However, the examiner asserts that these references do not show that CuKa radiation is required in making X-ray diffraction measurements of titanyl phthalocyanine crystals, suggesting that therefore uncertainty exists in the manner in which appellants have claimed their invention. (Answer, page 6). We disagree with the examiner's position taken here for the reasons expressed later in this opinion.

[2] Appellants' references numbered 1-8 listed on page 2 of this opinion support use of CuKa radiation in making X-ray diffraction measurements of titanyl phthalocyanine crystals. However, references numbered 9 and 10 listed on page 3 of this opinion do not support such use. Specifically, the Stout reference does not disclose making X-ray diffraction measurements specifically of titanyl phthalocyanine crystals. Also, the Sims reference specifically states Cuka radiation is used for X-ray diffractograms of GaPc-Cl films, but we cannot find disclosure of using Cuka radiation for titanyl phthalocyanine crystals.

[3] We note that both the Hiller and Sims publications were newly introduced by appellants on page 7 of their Brief, and the examiner did not acknowledge these publications in his Answer, but we consider them in this opinion for completeness sake. The examiner did consider all of the other listed references.

The examiner additionally argues that Stout actually teaches that the artisan would "use a radiation source other than Cu", based upon the text on page 4 of Stout (Answer, pages 6-7). Appellants argue that the examiner misinterprets page 4 of Stout in this regard. Appellants explain that Stout is referring to the atomic radius of each element rather than the atomic number of each element as shown in the Periodic Table of Elements, and therefore, Stout actually teaches that CuKa rays are used for calcium or elements less than it, which would include elements having an atomic radius less than calcium, which would include titanium (the element contained in appellants' crystal). (Reply Brief, page 2).

Upon our review of the Stout publication, we disagree with appellants' understanding of Stout. That is, Stout discloses "the CuKa rays are used for calcium or elements less than it, or cobalt or elements larger than it, and the MoKa rays are used for elements between them". (Stout, page 4 of the English translation). The Table of Periodic Properties of the Elements shows that the atomic radius of titanium (1.47 Å) is between the atomic radius of calcium (1.97 Å) and that of cobalt (1.25 Å). Calcium and elements less than it, would encompass all elements to the right of calcium, and cobalt and elements larger than it, would encompass all elements to the left of it. This interpretation would conflict with "MoKa rays are used for elements between them". On the other hand, if, as interpreted by the examiner, the atomic number of each element is what is intended in the Stout reference, calcium and elements less than it, would encompass all elements to the left of calcium, and cobalt and elements larger than

it, would encompass all elements to the right of cobalt, and no conflict exists for elements between calcium and cobalt with respect to MoKa rays. So, it appears to us that the examiner is correct in his assessment of Stout. However, because the Stout reference does not address the type of radiation used in making X-ray diffraction measurements of titanyl phthalocyanine crystals specifically, we cannot accord it as much evidentiary weight as other references that specifically address the types of radiation used in X-ray diffraction measurements of titanyl phthalocyanine crystals.

With regard to the Rule 132 Nukada Declaration, the examiner asserts that the experiments do not show that CuKa radiation was in fact employed for Example 1 of appellants' application; rather, the examiner asserts that the experiments in this declaration concern the prior art. (Answer, pages 8-9).

Upon our review of this declaration, we find that pages 2 and 3 indicate that an X-ray diffraction pattern was obtained for an oxytitanium phthalocyanine crystal disclosed in Fig. 2 of Suzuki (prior art reference) utilizing CuKa radiation. The resulting X-ray diffraction pattern is shown in Fig. 1 of the declaration. Pages 6-7 of the declaration also indicate that an X-ray diffraction pattern was obtained for the a-titanyl phthalocyanine crystal disclosed in Fujimaki (prior art reference) utilizing CuKa radiation. The resulting X-ray diffraction pattern is shown in Fig. 4 of the declaration.

Hence, the Rule 132 Nukada Declaration evidences that one of the inventors of the present invention utilized CuKa radiation in making X-ray diffraction measurements of both

an oxytitanium phthalocyanine crystal (of Suzuki) and an a-titanyl phthalocyanine crystal (of Fujimaki) in connection with providing comparative data presented in a Rule 132 declaration. We therefore strongly disagree with appellants' statement made on page 2 of their Reply Brief. This declaration does not state that "the examples of the application employed CuKa radiation" as stated by appellants. Rather, we agree with the examiner's statement made on page 8 of the Answer that the declaration concerns X-ray diffraction patterns of prior art titanium phthalocyanine crystals, not appellants' titanium phthalocyanine crystals. Therefore, this declaration is irrelevant with respect to evidencing whether appellants in fact utilized CuKa radiation in obtaining a maximum X-ray diffraction peak for any one of their titanium phthalocyanine crystals of their specification.

Turning now to the law applicable to the issue at hand, 35 U.S.C. § 112, paragraph 2, provides that "[t]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which applicant regards as his invention." This requires only that the claims set out and circumscribe a particular area with a reasonable degree of precision and particularity. **In re Moore**, 439 F.2d 1232, 1235, 169 USPQ 236, 238 (CCPA 1971).

Definiteness of claim language must be analyzed, not in a vacuum, but in light of:

(A) The content of the particular application disclosure;

(B) The teachings of the prior art; and

> (C) The claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made.

MPEP, § 2173.02 (Rev. 1 , Feb. 2000).

In the instance case, the specification is silent about the type of radiation source (? value) used in making X-ray diffraction measurements of appellants' titanyl phthalocyanine crystal. However, the prior art relied upon by appellants (with the exception of publications numbered 9 and 10 on page 3 of this opinion) provide specific teachings of using CuKa radiation in making X-ray diffraction measurements of titanyl phthalocyanine crystals. In light of these teachings, we believe that it would have been reasonably clear to one skilled in the art that appellants' claims mean that the maximum X-ray diffraction peak is obtained using CuKa as the source of radiation. We recognize that the examiner finds these teaching inadequate because they do not show that CuKa radiation is required in making X-ray diffraction measurements of titanyl phthalocyanine crystals. However, all that is necessary is that their teachings provide sufficient knowledge such that it would have been reasonably clear to one skilled in the art that appellants' claims mean that the maximum X-ray diffraction peak is obtained using CuKa as the source of radiation. We believe that one skilled in the art would interpret appellants' claims 3 and 5 to include the recognition that CuKa radiation would have been used to obtain the X-ray diffraction peak recited in these claims in light of the teachings of the references discussed above. The examiner

has not provided evidence (1) that in fact one skilled in the art would not use CuKa as the source of radiation to obtain the maximum X-ray diffraction peak for a titanyl phthalocyanine crystal or (2) that in fact such a person would have considered other types of radiation sources than CuKa radiation to be suitable for obtaining the maximum X-ray diffraction peak for a titanyl phthalocyanine crystal. If the examiner had done so, maybe a different conclusion would have resulted here. However, such evidence has not been made of record in this case.

Additionally, we note that if the scope of the invention sought to be patented can be determined from the language of the claims with a reasonable degree of certainty, then the claims fulfill the requirements of 35 U.S.C. 112, second paragraph. **In re Wiggins**, 488 F.2d 538, 541-2, 179 USPQ 421, 423 (CCPA 1973). Moreover, as stated, *supra*, the claims must set out and circumscribe a particular area with a reasonable degree of precision and particularity. **In re Moore**, 439 F.2d 1232, 1235, 169 USPQ 236, 238 (CCPA 1971).

Here, based upon the preponderance of the evidence on the record as analyzed above, we believe that appellants have particularly pointed out and distinctly claimed the subject matter which appellants regard as their invention with a reasonable degree of precision and particularity and with a reasonable degree of certainty. We believe that one skilled in the art would not be speculative in concluding that the scope of invention sought to be patented by appellants, as set forth in their claims, is that CuKa radiation is used to obtain the X-ray diffraction peak in view of the preponderance of the evidence.

SUMMARY

The rejection of claims 3, 4, and 5 under 35 U.S.C. §112, paragraph 2 is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

REVERSED

TERRY J. OWENS Administrative Patent Judge	)
JEFFERY T. SMITH Administrative Patent Judge	)BOARD OF PATENT APPEALS AND INTERFERENCES
BEVERLY PAWLIKOWSKI Administrative Patent Judge	)

Finnegan Henderson Farabow Garrett and Dunner
1300 I Street NW
Washington, D.C. 20005-3315

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HEARD: February 15, 2001

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DECISION: **REVERSED**